ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

GEO-5 2000

Aquifer Mapping in New Hampshire

OVERVIEW

The N.H. Department of Environmental Services, in cooperation with the U. S. Geological Survey, is completing a multi-year ($5 million) program of detailed study of the state's sand and gravel aquifers. The goal is to put together a more comprehensive picture of the occurrence of shallow ground water throughout the State than that which was provided by reconnaissance level mapping completed in the mid-1970's. Significant aquifers are being defined not only in terms of their location and areal extent, but also in terms of their hydraulic properties and internal characteristics. The resulting maps represent a major advance in our knowledge of this valuable, yet vulnerable, natural resource.

STUDY AREAS

For the purposes of the program, the State was divided into 14 study areas whose boundaries largely coincide with natural drainage basins. Work in each study area was completed over a three year period with an additional period of several months reserved for official review and release of the work products. Raw data is available to the public throughout the course of each study. However, any data which are interpreted from the raw data can only be released with the final report and aquifer maps.

PROCESS

USGS activities with regard to each study area can be viewed in terms of several distinct phases. Initial work consisted of the collection and review of all existing data which relate to the area of interest. This usually included the results of any previous hydrogeological studies. Also, well data which have been reported to the NH Water Well Board by local water well contractors was searched for further clues about subsurface conditions. These data collection efforts helped USGS investigators to target sand and gravel aquifers for inclusion in the next phase of their work. From this review of background information, the USGS teams proceeded into the field where they employed various techniques to determine the three-dimensional extent and internal characteristics of the significant water-bearing deposits. Observation wells were constructed as "windows" into the subsurface. They allowed samples of aquifer materials and associated ground waters to be collected and water levels to be directly measured. Geophysical techniques, such as seismic refraction surveys on land and seismic reflection surveys over water, were used as indirect means of "viewing" the subsurface hydrogeologic environment.

The results of all the field work were then carefully interpreted and used to construct maps which describe the characteristics of the target aquifers. All the aquifer maps are published at a scale of

1:24000, which is the same as the standard USGS 7 ½ minute topographic quadrangle maps, or a smaller scale of 1:48000 for the larger study areas. Each study area is covered by 2 sets of map plates, one depicting essentially "raw" data and the other depicting data which are more interpretive in nature. All mapped data also exist in a computerized format as geographic information system (GIS) coverages. Both sets show aquifer boundaries as the line of contact between stratified drift deposits and glacial till deposits. Other data presented by the first set include:

- locations of seismic lines
- locations of borings, observation wells, and water supply wells
- drainage basin divides
- water table elevation contours

The interpretative map set depicts the following data:

- saturated thicknesses
- transmissivities
- material types in four descriptive categories (fine, coarse, fine over coarse, and coarse over fine)

VALUABLE REFERENCES

These maps and accompanying explanatory text should serve as valuable references to municipalities who recognize the need to conserve and protect their ground water resources. By delineating zones with relatively high transmissivities, or, in other words, zones which have the greatest potential to yield water, they serve to identify areas which could be developed as future municipal water supplies. This potential confers upon such areas the need for the highest level of protection possible so that valuable resources are not lost through needless contamination. By delineating water table elevations, they present a general picture of the directions of ground water flow and therefore allow areas at risk of contamination from chemical spills or other sources to be readily identified. Municipal officials who use the maps as planning tools are presented with an unprecedented opportunity to safeguard New Hampshire's ground water resources while developing them in the common interest.

The maps dramatize the fact that aquifer boundaries do not respect political boundaries. Thus, the ground water stored within such aquifers represents a shared resource which must be managed cooperatively by neighboring communities. The efforts of one community to locally protect an important aquifer can be frustrated without similar action by an adjacent community.

FOR MORE INFORMATION

Further information and advice can be obtained from the New Hampshire Geological Survey at 271-4087, Office of State Planning at 271-2155, and regional planning commissions.